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NOTES FROM PACIFIC COAST OBSERVATORIES

THE SPECTRUM OF N. G. C. 7023

In July, 1914, I observed visually the spectrum of the nebula N. G. C. 7023. It was found to be continuous and appeared to resemble that of an early type star. No bright nebular lines and no dark lines were seen. The bright star imbedded in the nebulosity seemed to have the same spectrum. It was then planned to photograph the spectrum but it was not possible to do so until the last autumn.

Meanwhile the object was observed spectrographically by Pease at Mount Wilson, who found for the star a velocity of +0.7 km. and that it and the nebula "both show the same strong continuous spectrum crossed by absorption lines." (See page 240, Vol. XXVII of these PUBLICATIONS.)

In October, with the assistance of Mr. Hamilton, I secured a spectrogram, of about 35 hours' exposure, with the slit in position angle 25° and crossing the nebula about 35″ preceding the bright star. Similar plates were made of the star's spectrum and also two of it with the single-prism spectrograph as used in stellar observations.

The spectrum of the star is of the early type containing hydrogen and helium absorption lines, and has, in addition, hydrogen emission. This, recognizable in $H\gamma$, is strongly present in $H\beta$. The latter line is clearly doubly reversed as it is in such stars as Beta *Monocerotis*. The spectrum closely resembles that found by Curtiss for H. R. 985, in January 1916 (Plate E, Vol. II, PUBLICATIONS, Astronomical Observatory of the University of Michigan), except that the helium lines are narrower in N. G. C. 7023. The Mount Wilson observations seem not to have revealed the hydrogen emission.

The spectrogram of the nebula is weak in spite of the rather long exposure. Comparison of it with a weak one of the star shows the two to be identical as far as one can judge. Bright $H\beta$ seems to be present in the nebula but not so obviously emissive as on the star plate. However, the conditions for recording the emission were more favorable to the star than to the nebula. The spectrogram of the nebula is not strong enough for measurement for velocity. One high-scale plate of the star was measured and yielded a velocity of 10 km., a value fairly accordant with that got at Mount Wilson.

These observations and those by Pease evidence a like quality of light in the nebula and the star. We seem to have in this nebula another of those cases met with in the nebulae about *Merope* (*Lowell Observatory Bulletin* No. 55), and *Maia* of the *Pleiades* and about Rho *Ophiuchi* (*Lowell Observatory Bulletin* No. 75), where the identical quality of the star and nebular light and the apparent absorption by the nebulae of the light of more distant stars of the regions leads to the belief that the nebulosity is not self-luminous but shines as by reflected light of the bright stars associated with it.

Since the publication of my observations of the spectrum of the extended nebulosity near *Merope* which led me to the conclusion that the evidence all favored the assumption that the nebula shines by reflected star light, I have secured a similar spectrogram of the nebulosity near *Maia* with the same result: that the star and nebula shine by light identical in quality. It will be recalled that Hertzsprung (*A. N.* No. 4679) since carried out photometric observations to test this conception of the *Pleiades* nebulosity and that he found a result in accord with the interpretation the spectrograms led me to suggest. A recent plate of the nebula N. G. C. 2068 indicates that this is another nebula of this same class.

A photograph of nebula N. G. C. 7023 is reproduced in Plate 24, Vol. II, *Roberts' Celestial Photographs*, and another excellent one, by Keeler, in Plate 65, Vol. VIII, *Publications of the Lick Observatory*.

V. M. SLIPHER.

RECENT OBSERVATIONS OF NOVA AURIGAE, NOVA GEMINORUM NO. 1 AND NOVA GEMINORUM NO. 2

During the past year photographs of a number of the Novae have been made with the 40-inch Lowell reflector. Among these are an extended series of *Nova Persei* (1901) and several negatives for different dates for each of *Nova Aurigae*, *Nova Geminorum* No. 1 and *Nova Geminorum* No. 2. Approximate estimates of the magnitudes of the last named three objects are given herewith. The observations of *Nova Persei* will be given more at length in a forthcoming paper.

Nova Aurigae

Date	Magnitude	
1917 Feb. 9	12.4	
" 12	12.3	
Nov.13	12.8	image confused
1918 Jan. 3 & 4	12.3	